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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,939	10/29/2003	Yasuo Sawada	R2184.0268/P268	6142

24998 7590 02/21/2007

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EXAMINER	
BIBBINS, LATANYA	
ART UNIT	PAPER NUMBER
2627	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/694,939	SAWADA ET AL.	
	Examiner	Art Unit	
	LaTanya Bibbins	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 November 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable Spruit (US Patent Number 6,751,513 B1) in view of Yamada et al. (US PGPub 2001/0017833 A1).

Regarding claim 1, Spruit discloses an information recording apparatus for recording information on a recording medium by irradiating a pulsed light onto the recording medium (see column 3 lines 52-65 and Figure 5), comprising: a rotating mechanism that rotates the recording medium at one of predetermined recording speeds (see column 10 lines 18 and 19 and Figure 5 element 7); an optical head irradiating the pulsed light onto the recording medium (see column 3 lines 57 and 58 and Figure 5 element 2); and a controller (Figure 5 element 1) that controls the optical head so as to irradiate the pulsed light (column 3 lines 58 and 59) so that a length of a recording mark formed on the recording medium by irradiation of the pulsed light is an n times of a period Tw of a basic clock, where n is a natural number (see column 2 lines 59 and 60 and Figures 1a and 1b), the controller also controls the pulsed light in accordance with one of predetermined recording strategies which matches the one of the predetermined recording speeds (see column 9 lines 17-21) so that the pulsed light

contains a train of multi-pulses of a light (see column 1 lines 21 and 22) having a recording power Pw and a light having a bias power Pb is irradiated during intervals between the adjacent multi-pulses and a light having an erasing power Pe is irradiated during intervals between adjacent trains of the multi-pulses, where a relationship Pw>Pe>Pb is satisfied (see column 3 lines 60-64 and Figure 1b), wherein the controller adds an off-pulse to an end of a final pulse of the train of multi-pulses so that the light having the bias power Pb is irradiated during a period T1 of the off-pulse (see column 3 lines 62-65); and the controller is capable of setting the period T1 of the off-pulse to a predetermined value (see column 10 lines 62-64).

Spruit, however, fails to specifically teach a relationship where $0 \leq T1 < 0.2Tw$ is satisfied. Yamada, on the other hand, teaches an off pulse, or cooling pulse, with a duration z, where $0.125T \leq z \leq 1T$ (see paragraph [0027] and Figure 2), which satisfies the relationship $0 \leq T1 < 0.2Tw$.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the relationship of the cooling pulse width taught by Yamada into the information recoding apparatus taught by Spruit. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings in order to provide a method of recording and reproducing information capable of obtaining high signal quality and improvement in stability, reliability, and general-use properties (Yamada paragraph [0019]).

Regarding claim 2, Spruit discloses an information recording apparatus wherein the controller sets the predetermined value of the period T1 of the off-pulse when

recording is performed in accordance with one of the predetermined recording strategies (see column 10 lines 62-64).

Spruit does not teach that the recording strategy is used for the recording speed equal to or higher than 11 m/s. However, in Figures 2 and 5 Yamada teaches the use of the recording strategy for the recording speed higher than 11 m/s (specifically a maximum recording linear velocity of 12 m/s and 24 m/s in Figures 2 and 5 respectively).

Claims 3, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spruit (US Patent Number 6,751,513 B1) and Yamada et al. (US PGPub 2001/0017833 A1) and further in view of Nakamura (US Patent Number 6,631,109 B2).

Regarding claim 3, Spruit in combination with Yamada teach the information recording apparatus as claimd in claim 1, wherein the recording medium includes a recording layer formed of a material changeable into either an amorphous state or a crystal state (Spruit column 12 lines 16-19), and the controller uses one of the predetermined recording strategies according to which the predetermined value of the period T1 of the off-pulse is set (Spruit column 3 lines 62-65).

Spruit and Yamada do not teach a recrystallization upper limit linear velocity of the recording medium that is 9 m/s to 13 m/s. However, Nakamura teaches an optical storage medium whose phase change critical linear velocity is 0.7 times the highest

linear velocity (see column 7 lines 44-50), where the highest linear velocity of the optical recording medium is defined as 5 m/s to 28 m/s (column 3 line 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Spruit and Yamada with Nakamura. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the information recording apparatus of Spruit and Yamada with the optical storage medium of Nakamura in order to provide good write/erase characteristics and improve overwrite performances when the recording is performed at the highest linear velocity (see Nakamura column 7 lines 55-58).

Regarding claim 7, Spruit discloses an information recording method for recording information on a recording medium by irradiating a pulsed light onto the recording medium (column 1 lines 17-21) so that a length of a recording mark formed on the recording medium by irradiation of the pulsed light is n times of a period Tw of a basic clock, where n is a natural number (column 2 lines 59 and 60), the recording medium including a recording layer formed of a material changeable into either an amorphous state or a crystal state (Spruit column 12 lines 16-19), the method comprising the steps of: irradiating the pulsed light containing a train of multi-pulses of a light having a recording power Pw and a light having a bias power Pb during intervals between the adjacent multi-pulses and a light having an erasing power Pe during intervals between adjacent trains of the multi-pulses, where a relationship Pw>Pe>Pb is satisfied and adding an off-pulse to an end of a final pulse of the train of the multi-pulses

so that the light having the bias power Pb is irradiated during a period T1 of the off-pulse (column 1 lines 55-65 and Figure 1b).

Spruit does not teach the period T1 of the off-pulse being set to a predetermined value so that a relationship $0 \leq T1 < 0.2Tw$ is satisfied. Yamada, on the other hand, teaches an off pulse, or cooling pulse, with a duration z, where $0.125T \leq z \leq 1T$ (see paragraph [0027] and Figure 2), which satisfies the relationship $0 \leq T1 < 0.2Tw$.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the relationship of the cooling pulse width taught by Yamada into the information recoding apparatus taught by Spruit. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings in order to provide a method of recording and reproducing information capable of obtaining high signal quality and improvement in stability, reliability, and general-use properties (Yamada paragraph [0019]).

Spruit and Yamada do not teach a recording medium having a recrystallization upper limit linear velocity of 9 m/s to 13 m/s, however, Nakamura teaches an optical storage medium whose phase change critical linear velocity is 0.7 times the highest linear velocity (see column 7 lines 44-50), where the highest linear velocity of the optical recording medium is defined as 5 m/s to 28 m/s (column 3 line 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Spruit and Yamada with Nakamura. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the method of recording of Spruit and Yamada with the optical

storage medium of Nakamura in order to provide good write/erase characteristics and improve overwrite performances when the recording is performed at the highest linear velocity (see Nakamura column 7 lines 55-58).

Regarding claim 8, Spruit teaches an information recording method wherein the predetermined value is set to the period T1 of the off-pulse (see Spruit column 10 lines 62-64) but does not teach setting T1 when recording is performed at recording speed equal to or higher than 11 m/s.

However, in Figures 2 and 5 Yamada teaches the use of the recording strategy for the recording speed higher than 11 m/s (specifically a maximum recording linear velocity of 12 m/s and 24 m/s in Figures 2 and 5 respectively).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spruit (US Patent Number 6,751,513 B1) and Yamada et al. (US PGPub 2001/0017833 A1) as applied to claim 1, above, and further in view of Fukuzawa et al. (US Patent Number 6,891,790 B2).

Regarding claim 4, Spruit and Yamada do not teach an information recording apparatus wherein the controller uses one of the predetermined recording strategies according to which, when a rising of a head pulse of the train of the multi-pulses leads a time when one period Tw has passed after a rising of a logical data pulse by a time interval dTtop, a relationship $-0.3Tw<dTtop<0$ is satisfied. However, Fukuzawa teaches delaying the start of the top pulse Ttop with respect to the data to be recorded

such that the claimed relationship 3Tw<dTtop<0 is satisfied (see column 8 lines 23-38 where different values of Q, the delay of Ttop, are discussed).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the write strategy of Fukuzawa with the teachings of Spruit and Yamada. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings in order to avoid generating excessive heat (Fukuzawa column 6 lines 53-56).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spruit (US Patent Number 6,751,513 B1) and Yamada et al. (US PGPub 2001/0017833 A1) as applied to claim 1, above, and further in view of Miyamoto et al. (US Patent Number 6,236,635 B1).

Regarding claim 5, Spruit and Yamad do not teach an information recording apparatus wherein the controller uses one of the predetermined recording strategies according to which the period T1 of the off-pulse is set as T1=0. However Miamoto teaches, a cooling pulse width of 0T to 2.5T, which satisfies the relationship 0≤T1<0.2Tw (see column 9 lines 46-49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the information recording apparatus of Spruit and Yamada with the cooling pulse taught by Miyamoto. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings

in order to obtain a superior reproduced signal by optimizing the cooling pulse width (Miyamoto column 9 lines 55-57)

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spruit (US Patent Number 6,751,513 B1) and Yamada et al. (US PGPub 2001/0017833 A1) as applied to claim 1, above, and further in view of Ueki (US PGPub Number 2003/0086345 A1).

Regarding claim 6, Spruit and Yamada do not teach an information recording apparatus as claimed in claim 1, wherein the recording medium is a DVD+RW, and the predetermined recording strategies includes a strategy for a recording speed of 3.5 m/s, a strategy for a recording speed of 8.4 m/s and a strategy for a recording speed of 14 m/s, and wherein the predetermined value of the period T1 is set when the strategy for the recording speed of 14 m/s is used to generate the pulsed light when recording.

However, Ueki, teaches an optical disk apparatus wherein the recording medium is a DVD+RW (see paragraph [0052]) and the predetermined recording strategies includes a strategy for a recording speed of 3.5 m/s (see paragraph [0011] and [0046]), and a strategy for a recording speed of 14 m/s (see paragraph [0011] and [0046] where four times the normal velocity of 3.49 m/s is equivalent to 14 m/s), and wherein the predetermined value of the period T1 is set when the strategy for the recording speed of 14 m/s is used to generate the pulsed light when recording (see paragraph [0049] where a strategy for recording is designed to decide the width of the cooling pulse).

Although Ueki fails to specifically teach a strategy for a recording speed of 8.4 m/s, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate a recording strategy for 8.4 m/s since Ueki suggests a normal linear velocity of 3.49 m/s and high linear velocities such as twoce or four times the normal velocity are used in known drive apparatus for rewritable optical discs (see paragraph [0011]).

Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the DVD+RW recording strategies of Ueki with the optical disk apparatus of Spruit and Yamada. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings in order to correct a recording laser beam into an optimal waveform in accordance with a change in the linear velocity relating to the scanning of the disc (Ueki paragraph [0046]).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spruit (US Patent Number 6,751,513 B1), Yamada et al. (US PGPub 2001/0017833 A1) and Nakamura (US Patent Number 6,631,109 B2), as applied to claim 7, above, and further in view of Fukuzawa et al. (US Patent Number 6,891,790 B2).

Regarding claim 9, Spruit, Yamada, and Nakamura fail to teach an information recording method wherein when a rising of a head pulse of the train of the multi-pulses leads a time when one period Tw has passed after a rising of a logical data pulse by a time interval dTtop, a relationship $-0.3Tw<dTtop<0$ is satisfied.

However, Fukuzawa teaches delaying the start of the top pulse Ttop with respect to the data to be recorded such that the claimed relationship 3Tw<dTtop<0 is satisfied (see column 8 lines 23-38 where different values of Q, the delay of Ttop, are discussed).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the write strategy of Fukuzawa with the teachings of Spruit, Yamada, and Nakamura. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the teachings in order to avoid generating excessive heat (Fukuzawa column 6 lines 53-56).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Spruit (US Patent Number 6,751,513 B1), Yamada et al. (US PGPub 2001/0017833 A1) and Nakamura (US Patent Number 6,631,109 B2), as applied to claim 7, above, and further in view of Miyamoto et al. (US Patent Number 6,236,635 B1).

Regarding claim 10, Spruit, Yamaa, and Nakamura do not teach an information recording method wherein the period T1 of the off-pulse is set as T1=0. However Miamoto teaches, a cooling pulse width of 0T to 2.5T, which satisfies the relationship 0≤T1<0.2Tw (see column 9 lines 46-49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the information recording apparatus of Spruit ,Yamada, and Nakamura with the cooling pulse taught by Miyamoto. One of ordinary skill in the art at the time the invention was made would have been motivated to combine the

teachings in order to obtain a superior reproduced signal by optimizing the cooling pulse width (Miyamoto column 9 lines 55-57).

Response to Arguments

3. Applicant's arguments with respect to claims 1-10 have been considered but are moot in view of the new ground(s) of rejection.

Citation of Relevant Prior Art

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ahn et al. (US PGPub 2004/0218498 A1) discloses a method and apparatus to record data on an optical recording medium include generating a recording waveform having an erase pattern comprising a predetermined pulse having a high level which is higher than an erase power level and having a low level which is lower than the erase power level. The recording pattern includes a pulse sequence where Tmp represents a width of the multi-pulses constituting the recording pattern, Tlp represents a width of the last pulse including the recording pattern, and Tcl represents a time for which a cooling pulse lasts.

Narumi et al. (US PGPub 2002/0145963) discloses an optical information recording method including: irradiating a recording medium with laser light, wherein 0 signals having width nT are recorded or rewritten using continuous laser light having a power level Pe, and 1 signals having width nT are recorded or rewritten using a light

pulse train having a first pulse portion fp having power Pw and width xT (T: clock time), a multi-pulse portion having power Pw' and width yT, a low level pulse which has power Pb and width (1-y)T are applied, and an end pulse portion ep having power Pb' and width zT, wherein each of Pw and Pw' is greater than Pe, Pe is greater than each of Pb and Pb', and at least one of x, y and z is in a range as follows: $0.35 \leq x \leq 0.75$, $0.30 \leq y \leq 0.55$, $0.35 \leq z \leq 0.70$.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LaTanya Bibbins whose telephone number is (571) 270-1125. The examiner can normally be reached on Monday through Friday 7:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571 272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LaTanya Bibbins

WAYNE YOUNG
SUPERVISORY PATENT EXAMINER